DOCUMENT RESUME

ED 12 550 EC 073 667

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TITLE Cost Effectiveness for Gifted and Talented Educational Programs.
INSTITUTION Ohio State Dept. of Education, Columbus. Div. of Special Education.
PUB DATE [75]
NOTE 15p.

EDRS PRICE MF-$0.76 HC-$1.58 Plus Postage
DESCRIPTORS *Cost Effectiveness; *Educational Programs; *Evaluation Methods; Exceptional Child Education; Expenditure Per Student; Gifted; Guidelines; *Measurement Techniques; Program Budgeting

ABSTRACT

Presented is a systematic approach for analyzing cost effectiveness of gifted and talented educational programs in terms of categorizing funds, prorating expenditures, designing a data collection form, determining cost effectiveness, and considering multiple variable implications. All costs are reported to be subsumed under six major categories: administration, staff support personnel, supervision of instruction, direct instruction, auxiliary services, and operation and maintenance of school plant. Described are the methods of prorating expenditures which include the time method, average daily membership, time floor area, hour consumption, and quantity consumed method. A layout for a data collection form is provided as well as a measure for obtaining a cost effectiveness ratio. Also outlined are two examples of a multiple variable ratio system which notes ways to measure and weigh five major variables (student achievement, children's attitudes, parent concern, community input, and teacher opinion) in both self-contained and enrichment programs. Procedure examples and tables are also provided. (SB)

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COST EFFECTIVENESS FOR GIFTED AND TALENTED EDUCATIONAL PROGRAMS

Prepared for: Division of Special Education
Ohio Department of Education

EC073667

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Funded by Title V, Section 505, grant, "Region V Interrelated State Education Design for the Gifted, Ohio Component"

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Introduction

This study has been conducted to devise a process to account for costs of several different programs for developing educational services to Gifted and Talented students in various geographic locations.

Traditionally the measure of the cost of education has been the total dollar outlay divided by the total number of students; there has not been much consideration given to the categorization or the proration of those dollars to determine as accurately as possible the total actual costs attributed to specific programs/services.

Categorization Of Funds

All costs of any local education agency should be subsumed under the following six major categories:

1. **Administration** – expenditure in this category consists of those activities which have as their purpose the general regulation, direction and control of the offices of the school district that are system-wide.
2. **Staff Support Personnel** – expenditure in this category are those that were supportive in nature to the school districts and not otherwise allocated to category 1, e.g., psychologists, pupil personnel directors, counselors, etc.
3. **Supervision of Instruction** – expenditure in this category was directly related to principals, assistant principals, and members of their immediate staff.
4. **Direct Instruction** – teachers and/or teacher aides who provide full or part-time services in the actual teaching of students and educational materials, supplies and equipment.
5. **Auxiliary Services** – attendance officers, medical and dental inspection, nurses, librarians, transportation of pupils, playgrounds, auditors' fees and fixed charges.
6. **Operation and Maintenance of School Plant** – janitors and janitorial supplies, water, heat, electricity, and materials for maintenance of buildings and grounds.

Proration Of Expenditures

In selecting a method of prorating expenditures there are three important factors to consider:

1. **that the method have a direct relationship to the activity for which the expenditure is being prorated.**

2. **that the method be as simple and accurate as conditions allow.**

3. **that the method be feasible.**

Keeping in mind that the extent of the accounting capabilities has a direct bearing on the amount of proration necessary, there are numerous methods of prorating expenditures ranging from very simple to very complex. However, methods of proration of expenditures for public schools are generally based on one or more of the following:

1. **Time Method** – allocating a part of an expenditure to a given activity in proportion to the time spent in the activity.

Procedure Example

Salary	Gifted and Talented	Other Activities
$8,000.00	25%	75%

$8,000.00 × ¼ = $2,000.00 to Gifted and Talented

2. **Average Daily Membership (ADM)** – allocating a part of an expenditure to a given activity in proportion to the average daily membership of the pupils engaged in the activity.

Procedure Example

Expenditure	School A.D.M.	Gifted and Talented
$3,600.00	500	10

$3,600.00 × .10 = 36.00 to Gifted and Talented

3. **Time Floor Area** – allocating a part of an expenditure to a given activity in proportion to the gross floor area used by the activity and the length of time floor area is used.

Procedure Example

Operation and Maintenance	Gross Floor Space	Gifted and Talented Utilization	Gifted and Talented Hours per Week
$12,960.00	60,000 sq. ft.	5,000 sq. ft.	6

5/60 or 1/12 × $12,960.00 = 1080.00 × 6/36 or 1/6 = 180.00 to Gifted and Talented

4. **Hour Consumption** – allocating a part of an expenditure to a given activity in proportion to the length of time the activity used the facilities and the hourly rate at which the utility is consumed in the use of the facilities.

Procedure Example

Hourly Rate	Time Used by Gifted and Talented
$4.00	3 Hours

$4.00 × 3 = $12.00 to Gifted and Talented

5. **Number of Pupils Method** – allocating a part of an expenditure to an activity in proportion to the actual number of pupils involved.

Procedure Example

School A.D.M.	Total Pupils Transported	Gifted and Talented Transported	Expenditure
2,000	1,500	150	$24,000.00

6. **Quantity Consumed Method** – allocating a part of an expenditure to a given activity in proportion to the actual consumption of supplies or commodities.

In every instance of proration the same method should be used for comparable items.

Designing Data Collection Form

Once the categorization and prorating of expenditures have been established, a simple form should be designed to record the data to be used for the cost effectiveness.

Procedure Example

GIFTED AND TALENTED COST DATA

Model-Level-Area School District Date

General Information: **Total G&T**

A.D.M. Students in — school district
school building
program or classroom

Total Classrooms: school district
school building

Final Summary:

1. Administration
2. Staff Support
3. Supervision of Instruction
4. Direct Instruction
5. Auxiliary Services
6. Operation and Maintenance

Total Expenditure

A.D.M. of G&T Students

Expenditure per G & T

The above type of layout not only allows for the collection of data on a group basis, but also on an individual basis.

Cost Effectiveness Analysis

Cost effectiveness implies somewhat the same concept as accountability; i.e., the relationship of resources, process and goal fulfillment. Effectiveness implies impact or influence of one thing on another. Objectives are established to fulfill goals, and goals are fashioned to provide benefits. When measurable objectives are finally defined, various resource mixes to fulfill them, are priced. The cost effectiveness ratio is best when the optimum mix is attained. Cost effectiveness analyses are designed to measure the extent to which resources (costs) allocated to a specific objective under each of several alternatives actually contribute to accomplishing that objective so that different ways of gaining the objective may be compared.

Cost effectiveness is determined by dividing the average increase in test score by the cost per pupil.

$$\text{Cost Effectiveness} = \frac{\text{Average Increase In Test Scores}}{\text{Total Cost Per Pupil}}$$

A simple illustration is to determine the cost effectiveness ratios resulting from an experiment over a period of time, dealing with five separate resource mixes of the instructional process for five programs.

Program	Average Increase	Cost Pupil	CE Ratio
1	80	25	3.20
2	80	40	2.00
3	90	42	2.14
4	80	75	1.07
5	90	30	3.00

From the above analysis program 1 and 5 have precedence over 2, 3, and 4. In other words program 1 and 5 are better than the others, assuming all other variables were constant.

Multiple Variable Implications

The use of a single variable such as achievement is an important breakthrough for the cost effectiveness data. However, implication for multiple variable decision-making processes also becomes available when one begins to use the ratio of a criteria to the cost of a project.

The following is an example of a multiple variable ratio system. The example includes two types of programs for gifted children. One, a self-contained program; and program number two, an enrichment program. For the purposes of this example, there are five major variables to be considered and the effectiveness ratio. Given the costs computed by the procedures stated above, one might have the following five variables (fig. 1):

Variable A is student achievement. This achievement is based on a number of achievement measures – it could be criterion referenced scores, particular classes of students, or it could be the achievement of standardized achievement gain of standardized instruments.

Variable B. The attitudes of children. This must be a quantitative measurement on some basic self concept or attitude scale.

Variable C. A quantifiable measure of parent concern, involvement or opinion. It could be a questionnaire or it could be come more formal attitude scale, but again it must be a quantifiable measurement.

Variable D. Community input. It may be that a very important variable in the decision per program management is the involvement of the community and their attitudes toward a particular program. One of course must quantify that community input in some measure and enter it as a major variable.

Variable E. Teacher opinion. This would be, again, a quantifiable, measurable opinion scale of some type.

Figure I

Gifted
Self Contained Class

	A Achievement	B Student Attitude	C Parent Attitude	D Community Input	E Teacher Input
Mean Raw Score	70	40	40	60	80
Standard Scores	60	50	60	45	50
Weighted Value	1.0	.2	.5	.5	.8
Final Score	60	10	30	22.5	40

Total Score: 162.5

Figure II

Gifted Enrichment Program

	A Achievement	B Student Attitude	C Parent Attitude	D Community Input	E Teacher Input
Mean Raw Score	60	50	50	60	70
Standard Scores	50	60	65	45	45
Weighted Value	1.0	.2	.5	.5	.8
Final Score	50	12	32.5	22.5	36

Total Score: 153.0

Obviously one could go on with more major variables. It would depend on the particular priorities of the school district involved. Step number one would be listing the quantifiable raw scores on those particular major variables. For the purpose of this example, the following raw scores are indicated on each example. These are mean scores; that is, the group scores divided by the number of people within a particular group. It then becomes necessary to make these scores into some standardized comparable set of scores so one does a statistical routine which standardizes the criteria based on a mean of 50 and a standard deviation of 10. This then puts each of the scores in a position so that they could be compared with one another, and added or subtracted from one another.

The next major step is to "weight" or place a value on each of these particular major variables. It may be that for your purposes, achievement is a tremendous value and it is twice as important as any of the other major criteria. It may be that the parent concern is a major value. The weighted values are purely arbitrary administrative decisions. It may be that all criteria should be equated the same so you would weigh them equally and you would add them together. However, in this step, you can give differential value to each of your variables before your final criteria has been achieved.

For the purposes of this example, we are saying that the criteria of achievement has a weight of one, attitude of children has a weight of .2, parents .5, community input .5, and teacher opinion .8. One simply then multiplies the weighted value times the standard score to receive a quantifiable weighted measurement of that particular variable. Those weighted scores are then summed and you get a total score.

This score is the total measurement of that particular program. One then measures students in the other program, the enrichment program, under the same criteria.

That is, the five major criteria, a raw score for each of those criteria, transformed into a standard score and weighted under the same value system and that product summed for a total score of the value of that program. This new derived value can then be used in ratio format with the costs of the program, either by total costs or by student costs, and as long as these same arithmetical procedures are used in both classes, one can have input from many variables to assist in the cost effectiveness aspect of these programs for gifted children.

Summation

Gifted and Talented Educational Programs have not totally availed themselves of the concept of indepth analysis of traditional practice, functions and service. Until this form of systematic evaluation is carried out in detail, little objective evidence can be generated to satisfy the district's accountability committees or school boards. Ascertaining the existing effectiveness and efficiency of currently operating programs/services is paramount to asking for additional resources to do the job.